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The Role of Technology in Inclusive Education: Challenges and Opportunities in Developing Countries

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Abstract

The objective of inclusive education is to guarantee that every individual, irrespective of physical, intellectual, social or emotional limitations, is provided with equal access to educational opportunities. The advent of technology has led to the emergence of new possibilities for the implementation of inclusive education, particularly in resource-constrained developing countries. However, the implementation of technology in inclusive education in developing countries is confronted with a multitude of challenges, encompassing deficiencies in infrastructure and constraints in educator training. This article seeks to examine the role of technology in inclusive education in developing countries and identify the challenges and opportunities that arise. The research employs a literature review methodology to collate data from pertinent studies and proffer policy recommendations to enhance the role of technology in inclusive education.

Keywords: Language, Strengthening, high school students, word spinner

I. INTRODUCTION

Inclusive education is an approach that aims to guarantee that every child, irrespective of physical, intellectual, social or emotional differences, has equal access to education. The concept emerged from an international movement to advocate for the rights of individuals with special needs, with a particular emphasis on education that is welcoming to all, including those who were previously excluded from the formal education system due to their limitations.

On a global scale, inclusive education has emerged as a pivotal concern within the realm of international education policy. One of the most significant milestones in this agenda is the Salamanca Declaration (1994), which asserts that education systems should be able to respond to the needs of students with special needs by providing learning environments that support diversity. Furthermore, the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education), have set targets to ensure inclusive and equitable education for all children, including those in remote areas, the poor or with disabilities (Suwartiningsih, 2022).

Inclusive education is not merely the placement of children with special needs in regular schools; rather, it encompasses the creation of adaptive, supportive, and diverse learning environments. This entails the implementation of learning approaches that are responsive to different learning styles and individual needs, as well as active participation from students, teachers, parents, and communities.

In developing countries, the implementation of inclusive education is beset with more complex challenges. While the principles of inclusive education are widely recognised, their implementation is often constrained by a variety of factors, including infrastructural deficiencies constitute a significant impediment to the implementation of inclusive education in developing countries (Sari et al., 2022).

A significant number of developing countries are still lacking the fundamental infrastructure required to facilitate inclusive education, including buildings that are accessible to disabled students, physical accessibility, and specialised educational equipment. This presents a considerable obstacle to children with special needs participating in formal education. A crucial element of inclusive education is the preparedness and capabilities of the teaching personnel. In developing countries, a considerable number of educators have not undergone sufficient training in addressing the needs of students with special requirements, encompassing both pedagogical and psychological aspects. Those lacking adequate training often encounter difficulties in adapting inclusive teaching methodologies and may lack an understanding of the most effective approaches to supporting the learning of students with disabilities.

The educational resources required to facilitate inclusive education are frequently scarce in developing countries. These encompass adapted teaching materials, assistive technology such as special education software, and support services such as

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therapy and counselling. Furthermore, the distribution of educational resources is often inequitable, resulting in children in remote areas facing greater challenges in accessing inclusive education.

In some developing countries, social stigma against individuals with special needs persists. Discriminatory attitudes from society, including from teachers and fellow students, can impede the inclusive process in schools. A paradigm shift is required for inclusive education to succeed, whereby society views diversity as a strength rather than an obstacle (Khoiriyah et al., 2024).

In light of these challenges, technology presents a range of potential avenues for supporting the implementation of inclusive education. In developing countries, technology can serve as a conduit, bridging the gaps between limited infrastructure, resources, and teacher professional development.

The utilisation of technology facilitates enhanced access to learning materials that are tailored to the specific requirements of individual students. For instance, e-learning platforms can provide visual and audio content that supports diverse learning styles. Furthermore, technology enables the creation of learning materials that are accessible to students with hearing or visual impairments, such as the use of subtitles in learning videos or text-to-speech converters.

In developing countries, technology facilitates access to education for students who are unable to attend school in person. Distance learning and e-learning are especially advantageous for students with special needs who face mobility challenges or reside in remote locations. With internet access and appropriate devices, students can engage in learning from home or from a supportive community centre (Zahara et al., 2024).

Technological tools can be leveraged to educate teachers in the principles and practices of inclusive education. Digital platforms provide avenues for teachers to engage in online training, access educational resources, and collaborate with a global community of educators committed to inclusive education. These technology-based training programs can be adapted to encompass novel pedagogical approaches and effective intervention strategies for students with special needs.

Assistive technologies, including screen reader software, alternative communication tools and mobility devices, can facilitate the participation of students with physical or sensory disabilities in classroom learning activities. By overcoming physical and sensory barriers, these technologies enable students to learn in a more independent and productive manner.

The utilisation of technology facilitates the advancement of learning design, rendering it more responsive to individual requirements. The incorporation of AI (Artificial Intelligence) and machine learning-based applications enables educators to devise personalised learning strategies, with the capacity to analyse student needs in real-time and provide tailored feedback.

The Internet provides access to a global community of educators, experts, and organisations that support inclusive education. Developing countries can leverage technology to establish collaborative networks with other countries, access international education resources, and disseminate best practices in inclusive education. Notwithstanding the constraints of physical infrastructure, technology can assist in narrowing the educational disparity between urban and rural students. The utilisation of digital devices and the internet enables students in remote locations to access the same educational content as their counterparts in cities, thereby creating more equitable opportunities for all children (Taqi et al., 2024).

II. METHODS

This research employs the method of literature study, which entails the collection of data through the examination of a range of written sources, including scientific journals, books, reports, and policy documents pertinent to the subject matter under examination. This approach was selected because it enables researchers to gain a comprehensive understanding of previous studies, theories developed, and policies implemented concerning the role of technology in inclusive education in developing countries. By collecting and analysing relevant literature, the researcher can assess the challenges encountered and the opportunities available without the necessity of conducting field research, which requires more time and financial resources.

The analytical process involved searching for sources from reputable academic databases, including Google Scholar, JSTOR, and ScienceDirect. These databases were selected on the basis of their provision of access to a range of reliable, peer-reviewed scientific publications, thus ensuring the data obtained is of a high standard of quality. Google Scholar permits researchers to access journal articles from a variety of disciplines, JSTOR stores both historical and contemporary journals related to education, technology, and policy, while ScienceDirect provides access to journals in the field of educational technology and science that often contain the latest research and innovations in the field of educational technology.

The primary objective of this literature review is to identify the challenges encountered by developing countries in the utilisation of technology to facilitate inclusive education. These challenges include aspects such as a lack of technological infrastructure, limited internet access, low levels of technological literacy among teachers and students, and socio-economic constraints that exacerbate disparities in access to technology. Furthermore, this research considers potential avenues for enhancing the quality of inclusive education through technology. These include the prospective development of e-learning, the utilisation of AI-based applications to facilitate the learning of students with special needs, and collaboration between governments, the private sector and the global community to create more affordable and sustainable technology solutions.

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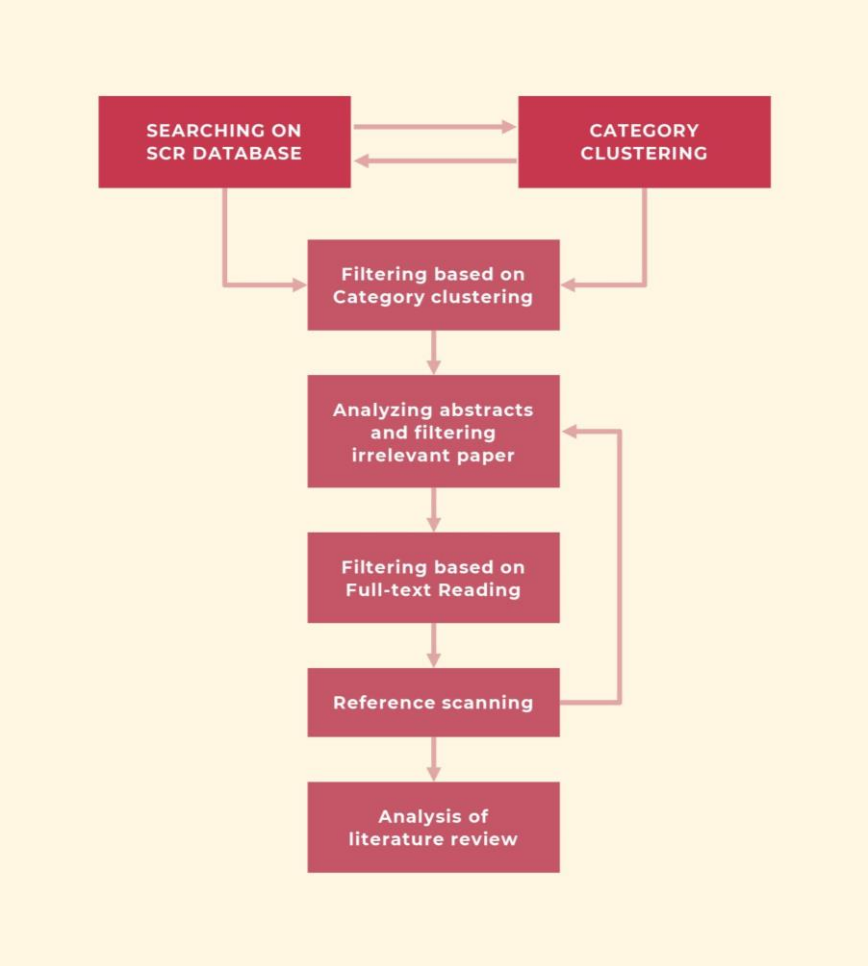

Figure 1. Literature Research Design

III. RESULTS AND DISCUSSION

A. *Limited Technology Infrastructure*

In many developing countries, one of the biggest challenges in implementing technology for inclusive education is the limited technology infrastructure. This includes poor access to the internet, lack of hardware such as computers or tablets in schools, and unstable electricity supply. These challenges result in a digital divide that further exacerbates inequalities in access to education between rich and poor areas, or between students with and without disabilities.

Limited Access to the Internet

Stable and fast internet access is a key prerequisite for utilising technology in education, especially to support inclusive education. However, in many developing countries, internet access is still very limited, especially in rural and remote areas. According to data from the International Telecommunication Union (ITU), more than half of the population in developing countries still do not have adequate internet access. In rural areas, this figure is much lower due to minimal communication infrastructure.

Internet Network Limitations in Schools: Many schools in developing countries do not have stable or fast internet access, which means teachers and students cannot utilise online learning platforms or digital resources available globally. Students with disabilities who require specialised software to support their learning, such as text-to-voice or visual programs, are further marginalised due to inadequate digital infrastructure (Sarkar et al., 2024).

Impact on Distance Education: The COVID-19 pandemic has shown how reliance on the internet for distance education has severely affected students with disabilities in developing countries. Many students in remote areas are unable to participate in online learning due to poor or non-existent internet networks, exacerbating inequalities in access to education.

Lack of Technology Tools in Schools

In addition to internet limitations, many schools in developing countries lack technology hardware such as computers, tablets or projectors, which are essential tools for integrating technology in inclusive learning processes. In some countries, these devices may be available in urban schools but are rare in rural schools or in less developed areas (Al-Masri et al., 2020).

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- Inadequate Resources: Schools that do not have enough computers or tablets for all students to use are often unable to implement technology-based learning methods. Students with special needs, who may require specialised devices to help them learn, such as large touch screens for students with motor impairments or screen reader software for students with visual impairments, rely heavily on the availability of this hardware.
- Limitations on Digital Resources for Teachers: Teachers working in environments with limited access to technology are often unable to utilise software and tools designed to support inclusive education. For example, apps designed for students with learning difficulties or programmes that provide materials tailored to individual needs cannot be used if schools do not have adequate hardware.

Unstable electricity supply

In addition to internet and hardware issues, limited electricity infrastructure is also a significant challenge in some developing countries. Schools in rural areas often experience regular power cuts, which limits the use of technology for learning.

- Dependence on Electricity: Many of the technological tools that support inclusive education, such as computers, projectors and audio-visual equipment, rely heavily on a steady supply of electricity. Without reliable electricity, schools cannot utilise these devices effectively.
- Expensive Alternatives: Some schools may use generators as a backup power source, but the cost of purchasing and operating generators often exceeds school budgets, especially in less developed regions. This makes it more difficult for these schools to adopt the technology required to support students with special needs (Collazos et al., 2024).

Digital Divide

The overall limitations of technology infrastructure exacerbate the digital divide between students who have access to technology and those who do not. Students with disabilities are often the main victims of this divide as they rely more on technology to gain equal access to education (Afzal et al., 2023).

- Effects on Students with Disabilities: Students with special needs often require specialised technology to help them learn, such as augmentative and alternative communication (AAC) software for students with speech impairments or visual devices for students with visual impairments. If these technologies are not available due to infrastructure limitations, students with disabilities will fall further behind their peers.
- Inequality between Urban and Rural Areas: The digital divide is also highly visible between urban and rural areas in developing countries. Schools in big cities may have better access to technology and resources, while rural schools often struggle with minimal infrastructure, leading to inequalities in the quality of education, especially for students with special needs.

Lack of Funding for Technology Infrastructure Development

Developing countries often face significant budget constraints, so funding priorities are focussed more on basic needs such as physical development and health rather than the development of educational technology infrastructure. This lack of funding makes it difficult for many schools to acquire the necessary technology to support inclusive education.

Governments in many developing countries often face huge budgetary pressures, resulting in very limited funding allocations for education, especially inclusive education. As a result, investment in educational technology that supports students with special needs is a low priority, despite its potential to support inclusive education (Rini, 2024).

Bureaucratic Barriers to Infrastructure Development

Technology infrastructure development in developing countries is also often hampered by complex bureaucracy, lack of supportive policies and delays in the implementation of technology-based education policies. While there are global initiatives that encourage the use of technology in education, realisation at the local level is often hindered by administrative barriers (Aminah & Saksono, 2021).

B. *Lack of Teacher Training: Challenges in Implementing Technology for Inclusive Education in Developing Countries*

One of the main challenges in implementing technology for inclusive education in developing countries is the lack of adequate training for educators. Teachers play a critical role in ensuring the successful integration of technology in education, particularly in inclusive environments involving students with special needs. However, many teachers in developing countries lack the necessary skills and knowledge to effectively utilise technology to support inclusive education.

Lack of Access to Relevant Training Programmes

In developing countries, access to training programmes for teachers is often limited, especially when it comes to technology and inclusive education. Many available training programmes focus on general topics such as classroom management or conventional learning methods but rarely emphasise educational technology, let alone technology for the needs of students with disabilities. As a result, teachers do not get enough training to develop skills in:

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- Inclusive use of educational hardware and software: Technologies such as assistive technologies, interactive educational applications and specialised software for students with special needs are still not fully understood by teachers in developing countries.
- Technology-based learning design: Teachers may not be trained in designing inclusive learning experiences using technology, such as making learning materials accessible to students with different needs (for example, providing alternative audio or text versions).
- Differentiated learning: Many teachers are unfamiliar with learning approaches that take into account students' varying ability levels and learning styles, especially those that use technology as a tool for special needs (Ghaisani et al., 2024).

Limitations in the Education System

Many developing countries have education systems that are still focussed on traditional approaches. Inclusive education and technology are not yet part of the standard curriculum of teacher training colleges or other professional development institutions. This means that most teachers do not have a deep understanding of the concept of inclusion or how technology can support the learning of students with special needs.

In addition, some developing countries still adopt a top-down approach, where education policy is centrally controlled without much input from teachers. As a result, training needs that focus on technology and inclusive education are often overlooked, as the policy does not prioritise upskilling teachers in these areas (Yasdin & Muksins, 2024).

Training Infrastructure Constraints

Limited access to education infrastructure is also a major obstacle to the provision of training for teachers. In many areas, especially in rural areas, adequate training facilities and technological resources such as computers, software or internet access are often not available. Teachers in these areas are unable to attend in-person training programmes and online training is sometimes difficult due to connectivity issues.

In addition, training providers often lack the funding and resources to provide comprehensive programmes. Existing programmes may only offer short training courses that do not provide the in-depth understanding or practical experience necessary for teachers to become competent in the use of inclusive education technology (Syafruddin et al., 2024).

Lack of follow-up support and mentoring

One important aspect of technology training is the ongoing support and mentoring for teachers after formal training. However, in many developing countries, this support is often inadequate. After completing the training, teachers are often left to face the day-to-day challenges without additional guidance. This results in inconsistent and suboptimal implementation of technology in inclusive learning.

Follow-up support, such as coaching by experienced mentors, can help teachers overcome the difficulties they face when integrating technology in inclusive classrooms. However, due to budget and resource constraints, many training programmes do not offer this coaching mechanism, leaving teachers feeling unprepared when it comes to using technology in real classroom situations (Rasmitadila et al., 2022).

Teachers' Attitudes towards Technology and Inclusive Education

Even when training is available, teachers' attitudes towards technology and inclusive education can be a barrier to effective adoption. Some teachers, especially those who have been teaching with conventional methods for a long time, may be hesitant to adopt new technologies. They may feel that technology is too complicated or irrelevant to their teaching style, especially if they do not receive convincing training or ongoing support.

This attitude is also exacerbated by the perception that students with special needs require more attention, so technology will only add to the workload. Without the right approach to training, teachers can feel overwhelmed and ultimately reluctant to try technological solutions that could actually help (Ediyanto & Kawai, 2023).

Implications for Inclusive Education

The lack of adequate teacher training in the use of technology for inclusive education can have a serious impact on the success of inclusion programmes in developing countries. Without sufficient skills, teachers may not be able to provide a supportive learning environment for students with special needs. Technology, which should be a tool to widen access to education, is not used optimally, and the potential of inclusive education to increase the participation of marginalised students may be hampered.

As a consequence, students with special needs may remain behind, facing barriers in obtaining a quality education that suits their needs. It also creates a gap between schools that have teachers with adequate inclusive technology training and those that do not (Mariyono, 2024).

C. *Global Collaboration*

One of the main challenges in implementing technology for inclusive education in developing countries is the lack of adequate training for educators. Teachers play a critical role in ensuring the successful integration of technology in education, particularly

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In addition, some developing countries still adopt a top-down approach, where education policy is centrally controlled without much input from teachers. As a result, training needs that focus on technology and inclusive education are often overlooked, as the policy does not prioritise upskilling teachers in these areas (Usman et al., 2024).

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In addition, training providers often lack the funding and resources to provide comprehensive programmes. Existing programmes may only offer short training courses that do not provide the in-depth understanding or practical experience necessary for teachers to become competent in the use of inclusive education technology (Limbong et al., 2024).

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As a consequence, students with special needs may remain behind, facing barriers in obtaining a quality education that suits their needs. It also creates a gap between schools that have teachers with adequate inclusive technology training and those that do not (Kurnia & Syamsiyah, 2024).

D. *Challenges in Implementing Technology for Inclusive Education*
While technology offers many benefits, its application in inclusive education in developing countries is faced with a number of serious challenges that need to be overcome.

Limited Technology Infrastructure
One of the biggest challenges in implementing technology in developing countries is inadequate infrastructure. Many areas still lack access to stable and fast internet, as well as the hardware needed to run educational technology. These limitations exacerbate the education access gap and prevent students with special needs from benefiting from existing technologies. Therefore, greater investment in technology infrastructure, including the provision of adequate internet networks and devices, is essential to optimise the potential of inclusive education.

Lack of teacher training and skills
Inadequate training for educators is another barrier to implementing technology for inclusive education. Many teachers in developing countries do not have the necessary skills to use technology in teaching, especially in the context of students with special needs. Teacher training programmes that focus on the use of technology and inclusive education strategies should be developed and implemented. This training should include ways to design an inclusive curriculum, as well as techniques for using technology in ways that support the learning of all students (Rahmah et al., 2024).

Community awareness and attitudes
Public awareness of the importance of inclusive education and the potential of technology is also a significant challenge. In many developing countries, there is still stigma and lack of understanding about education for students with special needs. Communities need to be educated about the benefits of inclusive education and how technology can help overcome the challenges. Outreach programmes involving various stakeholders, including governments, educational institutions and non-governmental organisations, can increase awareness and support for inclusive education.

Opportunities through collaboration and innovation
To realise effective inclusive education in developing countries, collaboration between various stakeholders is essential. Governments, international organisations, the private sector and local communities need to work together to overcome existing challenges and take advantage of the opportunities offered by technology. Investment in research and development of disability-friendly education technologies is also crucial to create innovative solutions that can be applied locally.
With collaborative and innovative approaches, inclusive education in developing countries can be strengthened, and technology can be effectively integrated to provide equitable access to education for all students. Building strong and sustainable support networks will ensure that inclusive education is not just a desirable concept, but also a reality that is accessible to every student in developing countries (HAMKA et al., 2024).

IV. CONCLUSIONS

The potential of technology to transform the way in which education is delivered and received is considerable, particularly in the context of inclusive education in developing countries. Inclusive education is an approach that acknowledges and celebrates the diversity of students, including those with special educational needs. In this context, technology can be employed as a means of addressing deficiencies in educational access. To illustrate, educational software that is designed to accommodate different learning styles and individualised needs can assist students with disabilities in engaging in the learning process in a more effective manner. The utilisation of technology facilitates the provision of educational content that is accessible to all students, irrespective of their abilities. Digital learning platforms are capable of presenting materials in a variety of formats, including text, audio, video and graphics. This is particularly crucial for students with diverse special needs, such as visual or hearing impairments. For instance, the utilisation of assistive technology instruments, such as screen readers or subtitles, can enhance accessibility for students with disabilities. Consequently, technology plays a pivotal role in fostering an inclusive learning environment, wherein every student is afforded the chance to learn and flourish. Furthermore, technology enables global collaboration and interaction. Students in developing countries can connect with their peers around the world through online forums, discussion groups and collaborative projects. This kind of interaction not only enriches students' learning experience, but also helps them develop important social and collaborative skills. Additionally, access to a global community allows students with special needs to find support, resources and best practices from different parts of the world, which can in turn facilitate their learning process.

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REFERENCES

Afzal, A., Khan, S., Daud, S., Ahmad, Z., & Butt, A. (2023). Addressing the Digital Divide: Access and Use of Technology in Education. *Journal of Social Sciences Review*, *3*(2), 883–895. https://doi.org/10.54183/jssr.v3i2.326

Al-Masri, E., Kabu, S., & Dixith, P. (2020). Emerging Hardware Prototyping Technologies as Tools for Learning. *IEEE Access*, *8*, 80207–80217. https://doi.org/10.1109/ACCESS.2020.2991014

Aminah, S., & Saksono, H. (2021). Digital Transformation of the Government: A Case Study in Indonesia. *Jurnal Komunikasi: Malaysian Journal of Communication*, *37*(2), 272–288. https://doi.org/10.17576/JKMJC-2021-3702-17

Baran, M., & Clutterbuck, D. (2023). Mentoring as a tool to support innovative work behavior of employees. *Przegląd Organizacji*, 351–359. https://doi.org/10.33141/po.2023.04.36

Collazos, J. S. G., Ardila, L. M. C., & Cardona, C. J. F. (2024). Energy transition in sustainable transport: concepts, policies, and methodologies. *Environmental Science and Pollution Research*. https://doi.org/10.1007/s11356-024-34862-x

Ediyanto, E., Kawai, N., Hayashida, M., Matsumiya, N., Siddik, M. A. B., & Almutairi, A. T. (2021). Indonesian Teachers' Attitudes Toward Inclusive Education. *Discourse and Communication for Sustainable Education*, *12*(2), 31–44. https://doi.org/10.2478/dcse-2021-0014

Ediyanto, & Kawai, N. (2023). The measurement of teachers' attitudes toward inclusive education: An empirical study in East Java, Indonesia. *Cogent Education*, *10*(2). https://doi.org/10.1080/2331186X.2023.2229014

Fahrudin, F. A., & Fahrudin, F. I. (2024). Food Biotechnology in Indonesia: Obstacles and Prospects in the Future. *International Journal of Research and Innovation in Applied Science*, *IX*(IX), 170–174. https://doi.org/10.51584/IJRIAS.2024.909015

Ghaisani, A., Sefriani, S., & Safitri, A. A. (2024). The Lion Air JT610 Crash Due to Lack of Pilot Training: Is There Responsibility for Indonesia? *Uti Possidetis: Journal of International Law*, *5*(2), 303–332. https://doi.org/10.22437/up.v5i2.33724

HAMKA, D., RIANDI, R., SUWARNA, I. R., & ANWAR, S. (2024). Challenges and Opportunities for Using Website-Based Technology to Increase the Technological and Engineering Literacy. *The Eurasia Proceedings of Science Technology Engineering and Mathematics*, *27*, 178–186. https://doi.org/10.55549/epstem.1518778

Khoiriyah, U., Karwanto, K., Setyowati, S., Nursalim, M., & Khamidi, A. (2024). Analysis of Inclusive Education Policy Implementation in Developing Countries. *EDUKASIA: Jurnal Pendidikan Dan Pembelajaran*, *5*(1), 851–858. https://doi.org/10.62775/edukasia.v5i1.868

Kurnia, N., & Syamsiyah, S. F. (2024). The Role of Parents in the Implementation of Inclusive Education at MI Ma'arif 56 Tempurejo, Jember, East Java. *SPEED Journal : Journal of Special Education*, *8*(1), 68–77. https://doi.org/10.31537/speed.v8i1.1890

Limbong, E., Setiawan, I., & Hamilton, A. (2024). Bridging the Gap: The Reality of Digital Technology Integration by Indonesian Pre-service EFL Teachers. *Script Journal: Journal of Linguistics and English Teaching*, *9*(1), 58–78. https://doi.org/10.24903/sj.v9i1.1524

Mariyono, D. (2024). Indonesian mosaic: the essential need for multicultural education. *Quality Education for All*, *1*(1), 301–325. https://doi.org/10.1108/QEA-05-2024-0042

Rahmah, L., Purwanta, E., Wijayanti, W., & Suhardiman, S. (2024). Navigating the Curriculum Landscape: The Impact of Curriculum 2013 and Merdeka Curriculum on Teachers' and Students' Learning Outcomes in Indonesia. *Journal of Ecohumanism*, *3*(6), 917–931. https://doi.org/10.62754/joe.v3i6.4061

Rasmitadila, Humaira, M. A., Rachmadtullah, R., Samsudin, A., & Nurtanto, M. (2022). Exploring Lecturers' Perspectives on Inclusive Elementary School Mentoring Programs based on University-School Collaborative Partnerships in Indonesia. *Journal of Education and E-Learning Research*, *9*(4), 233–239. https://doi.org/10.20448/jeelr.v9i4.4202

Rini, I. W. (2024). Funding Problems in Educational Institution: Morality and Professionalism Perspectives. *Jurnal Alwatzikhoebillah : Kajian Islam, Pendidikan, Ekonomi, Humaniora*, *10*(1), 73–80. https://doi.org/10.37567/alwatzikhoebillah.v10i1.2362

Sari, Z. P., Sarofah, R., & Fadli, Y. (2022). The Implementation of Inclusive Education in Indonesia: Challenges and Achievements. *Jurnal Public Policy*, *8*(4), 264. https://doi.org/10.35308/jpp.v8i4.5420

Sarkar, S., Kakade, K., A.K., S., & R, R. (2024). Utilising blockchain technology to implement a security control method for node access to the Internet of Things. *Intelligent Decision Technologies*, *18*(2), 953–963. https://doi.org/10.3233/IDT-230136

Suwartiningsih, S. (2022). INCLUSIVE EDUCATION EFFORTS FOR CHILD REFUGEES IN INDONESIA WITHIN MULTI-STAKEHOLDER PARTNERSHIP (MSPS) FRAMEWORK. *Indonesian Journal of International Relations*, *6*(2), 229–246. https://doi.org/10.32787/ijir.v6i2.359

Syafruddin, S., Suastra, I. W., & Lasmawan, I. W. (2024). Implementation of the Merdeka Curriculum and Readiness of Educational Infrastructure in Elementary Schools. *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, *8*(3), 1873. https://doi.org/10.58258/jisip.v8i3.7178

Taqi, M., Hamaidan, H., & Khan, R. (2024). *The Prospects of Artificial Intelligence and Machine Learning in the Stock Market* (pp. 181–199). https://doi.org/10.4018/979-8-3693-4382-1.ch009

Usman, H., Yarmi, G., Sarifah, I., Hasanah, U., Wardhani, P. A., Sari, W. K., & Fajarianto, O. (2024). Explore the Needs of Competency Development Model for Prospective Elementary School Teachers Based on Knowledge Management System In Indonesia. *Revista de Gestão Social e Ambiental*, *18*(1), e06206. https://doi.org/10.24857/rgsa.v18n1-148

Yasdin, Y., & Muksins, M. (2024). Political paradigms and vocational education policy in Indonesia: a document analysis. *Quality Education for All*, *1*(1), 204–221. https://doi.org/10.1108/QEA-10-2023-0007

Zahara, A., Hasanah, F., Habib, H., & Sabarrudin. (2024). The Influence of Advancements in AI Chat GPT Technology in Students' Learning Process. *BICC Proceedings*, *2*, 132–137. https://doi.org/10.30983/bicc.v1i1.117